

Development of kilo-pixel arrays of transition-edge sensors for x-ray spectroscopy

NASA authors: J.S. Adams, S.R. Bandler, S.E. Busch, J.A. Chervenak, M.P. Chiao, M.E. Eckart, A.J. Ewin, F.M. Finkbeiner, R.L. Kelley, D.P. Kelly, C.A. Kilbourne, M.A. Leutenegger, J.-P. Porst, F.S. Porter, C.A. Ray, J.E. Sadleir, S.J. Smith, E.J. Wassell NIST authors: W.B. Doriese, J.W. Fowler, G.C. Hilton, K.D. Irwin, C.D. Reintsema, D.R. Schmidt, D.S. Swetz, J.N. Ullom, L.R. Vale

We are developing kilo-pixel arrays of transition-edge sensor (TES) microcalorimeters for future X-ray astronomy observatories or for use in laboratory astrophysics applications. For example, Athena/XMS (currently under study by the European Space Agency) would require a close-packed 32x32 pixel array on a 250-micron pitch with < 3.0 eV full-width-half-maximum energy resolution at 6 keV and at count-rates of up to 50 counts/pixel/second.

We present characterization of 32x32 arrays. These detectors will be readout using state of the art SQUID based time-domain multiplexing (TDM). We will also present the latest results in integrating these detectors and the TDM readout technology into a 16 row x N column field-of-view instrument.